This listing of claims will replace all prior versions and listings of claims in the application:

<u>Listing of Claims:</u>

1. (Previously Presented) A method of embedding a digital watermark in a master image, said embedding method comprising the steps of:

extracting blocks of a predetermined size from said master image;

processing image data corresponding to each block by orthogonal transform;

comparing orthogonal transformed coefficients between at least two blocks having a predetermined relationship with each other and making the coefficients satisfy a preset order of magnitude according to bit information specified as the digital watermark;

quantizing the coefficients obtained by the orthogonal transform with a quantization table and using the quantized coefficients to embed the bit information, wherein embedding the bit information is carried out when, are not all equal to zero; and

processing each block with the embedded bit information by inverse orthogonal transform, so as to output a resulting image with the digital watermark embedded therein.

2. (Original) An embedding method in accordance with claim 1, wherein the predetermined relationship between the at least two blocks is an arrangement of contiguity.

3. (Currently Amended) An embedding method in accordance with claim <u>7</u> [[1]], wherein the orthogonal transform is discrete cosine transform.

4. (Canceled).

5. (Currently Amended) An embedding method in accordance with claim <u>7</u> [[1]], said method further comprising the steps of:

converting the image data into a system of a luminance Y and color differences Cb and Cr, prior to the orthogonal transform, and carrying out discrete cosine transform of the luminance Y and the color differences Cb and Cr as the orthogonal transform; and

embedding the bit information in coefficients obtained by the discrete cosine transform of the luminance Y.

6. (Canceled).

7. (Currently Amended) <u>A method of embedding a digital watermark in a master image, said embedding method comprising the steps of:</u>

    <u>extracting blocks of a predetermined size from said master image;</u>

    <u>processing image data corresponding to each block by orthogonal transform;</u>

    <u>comparing orthogonal transformed coefficients between at least two blocks having a predetermined relationship with each other and making the coefficients satisfy a preset order of magnitude according to bit information specified as the digital watermark;</u>

    <u>quantizing the coefficients obtained by the orthogonal transform with a quantization table and using the quantized coefficients to embed the bit information, wherein embedding the bit information is carried out when, are not all equal to zero; and</u>

    <u>processing each block with the embedded bit information by inverse orthogonal transform, so as to output a resulting image with the digital watermark embedded therein;</u>

~~An embedding method in accordance with claim 1, said method further comprising the steps of:~~

    introducing a logic function that is true when a difference between the orthogonal transformed coefficients of the at least two blocks having the predetermined relationship is in a preset range; and

    modifying a procedure adopted to embed the bit information, based on the true and false state of the logic function.

8. (Original) An embedding method in accordance with claim 7, said method further comprising the steps of:

    providing a secret key corresponding to each coefficient; and

    modifying the procedure adopted to embed the bit information, based on the secret key corresponding to each coefficient and the true and false state of the logic function with regard to the coefficient.

9. (Currently Amended) An embedding method in accordance with claim <u>7</u> [[1]], said method further comprising the steps of:

    providing a basic pattern, which is defined in a two-dimensional manner as a combination of binary information, as information of the digital watermark;

specifying each piece of binary information included in the provided basic pattern as the bit information to be embedded; and

embedding the binary information of the basic pattern by setting the at least two blocks having the predetermined relationship to one unit.

10. (Previously Presented) An embedding method in accordance with claim 9, said method further comprising the step of:

embedding the basic pattern in the image data iteratively a predetermined number of times, when the number of elements constituting the basic pattern is greater than the number of extracted blocks.

11. (Original) An embedding method in accordance with claim 9, wherein the basic pattern has redundancy.

12. (Previously Presented) An embedding method in accordance with claim 11, wherein the basic pattern having redundancy is a density pattern.

13. (Currently Amended) A method of decoding a digital watermark from a master image with the digital watermark embedded therein via the method of claim 7 [[1]], said decoding method comprising the steps of:

extracting blocks of a predetermined size from said master image;

processing image data corresponding to each block by orthogonal transform; and

comparing orthogonal transformed coefficients between at least two blocks having a predetermined relationship with each other and extracting bit information, based on a preset order of magnitude that is applied to the coefficients.

14. (Original) A decoding method in accordance with claim 13, wherein the predetermined relationship between the at least two blocks is an arrangement of contiguity.

15. (Original) A decoding method in accordance with claim 13, said method further comprising the steps of:

converting the image data into a system of a luminance Y and color differences Cb and Cr, prior to the orthogonal transform, and carrying out discrete cosine transform of the

luminance Y and the color differences Cb and Cr as the orthogonal transform; and

extracting the bit information, based on coefficients obtained by the discrete cosine transform of the luminance Y.

16. (Previously Presented) A decoding method in accordance with claim 13, said method further comprising the steps of:

arranging the extracted bit information and finding a repetitive pattern in the arranged bit information to restore the repetitive pattern as a basic pattern; and

decoding the digital watermark from the basic pattern.

17. (Currently Amended) An apparatus for embedding a digital watermark in a master image, said digital watermark embedding apparatus comprising:

block extraction means that extracts blocks of a predetermined size from said master image;

transformation means that processes image data corresponding to each block by orthogonal transform;

bit information embedding means that compares orthogonal transformed coefficients between at least two blocks having a predetermined relationship with each other and makes the coefficients satisfy a preset order of magnitude according to bit information specified as the digital watermark;

coefficient quantizing means that quantize the coefficients obtained by the orthogonal transform with a quantization table and use the quantized coefficients to embed the bit information, wherein embedding the bit information is carried out when the quantized coefficients of the at least two blocks are not all equal to zero; and

output means that processes each block with the embedded bit information by inverse orthogonal transform, so as to output a resulting image with the digital watermark embedded therein;

logic function introduction means that introduces a logic function that is true when a difference between the orthogonal transformed coefficients of the at least two blocks having the predetermined relationship is in a preset range; and

procedure modification means that modifies a procedure adopted to embed the bit information, based on the true and false state of the logic function.

18. (Previously Presented)   An apparatus for decoding a digital watermark from a master image with the digital watermark embedded therein by the apparatus of claim 17, said digital watermark decoding apparatus comprising:

block extraction means that extracts blocks of a predetermined size from said master image;

transformation means that processes image data corresponding to each block by orthogonal transform; and

bit information extraction means that compares orthogonal transformed coefficients between at least two blocks having a predetermined relationship with each other and extracts bit information, based on a preset order of magnitude that is applied to the coefficients.

19. (Currently Amended)   A computer storage device in which a program for embedding a digital watermark in a master image is recorded in a computer readable manner, said program causing a computer to attain the functions of:

extracting blocks of a predetermined size from said master image;

processing image data corresponding to each block by orthogonal transform;

comparing orthogonal transformed coefficients between at least two blocks having a predetermined relationship with each other and making the coefficients satisfy a preset order of magnitude according to bit information specified as the digital watermark;

quantizing the coefficients obtained by the orthogonal transform with a quantization table and using the quantized coefficients to embed the bit information, wherein embedding the bit information is carried out when the quantized coefficients of the at least two blocks are not all equal to zero; ~~and~~

processing each block with the embedded bit information by inverse orthogonal transform, so as to output a resulting image with the digital watermark embedded therein

introducing a logic function that is true when a difference between the orthogonal transformed coefficients of the at least two blocks having the predetermined relationship is in a preset range; and

modifying a procedure adopted to embed the bit information, based on the true and false state of the logic function.

20. (Previously Presented) A computer storage device in which a program for decoding a digital watermark from a master image with the digital watermark embedded therein via the method recorded in the recording medium of claim 19 is recorded in a computer readable manner, said program causing a computer to attain the functions of:

extracting blocks of a predetermined size from said master image;

processing image data corresponding to each block by orthogonal transform; and

comparing orthogonal transformed coefficients between at least two blocks having a predetermined relationship with each other and extracting bit information, based on a preset order of magnitude that is applied to the coefficients.